

NETWORK ANALYZER 5530 NA-C R18

Sektor za fiksnu pristupnu mrežu

April 2019

Network analyzer

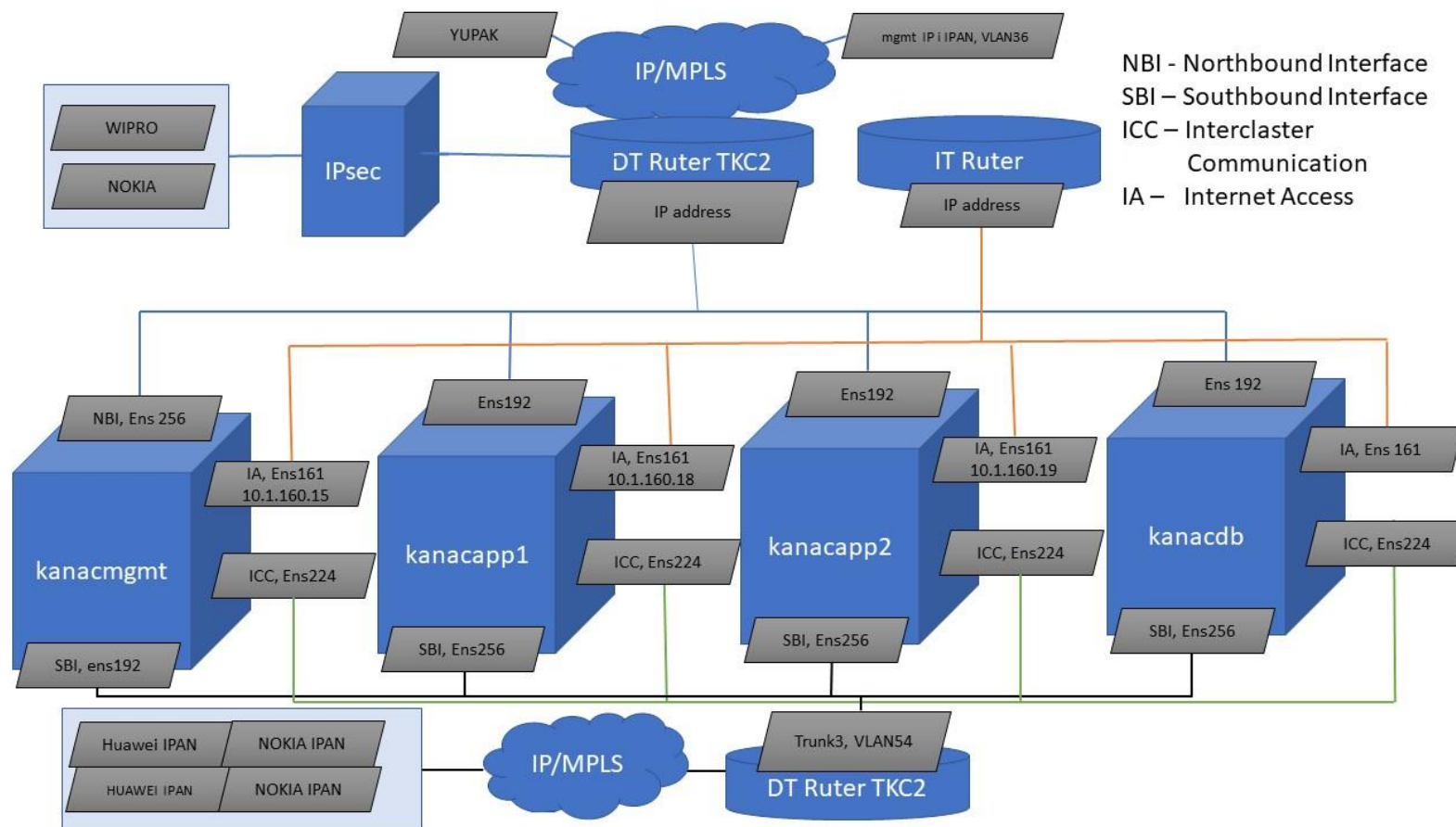
- *Network analyzer* je softverska aplikacija razvijena iz potrebe za alatom koji će omogućiti prikupljanje podataka, analizu mreže, rešavanje problema i optimizaciju DSL linija.
- Funkcionalnosti (moduli) NA:
 - **Network assessment** – na osnovu nadgledanja svih DSL linija u mreži i prikupljanje statistika daje procenu kvaliteta mreže
 - **Dynamic line management (DLM)** – vrši automatsko optimizovanje linije u slučaju degradacije kvaliteta promenom linijskog profila
 - **Line diagnosis** – detektuje i rešava probleme vezane za degradaciju performansi i stabilnosti
 - **Single-end line testing (SELT)** - detektuje i lokalizuje probleme vezane za konektivnost
 - **Upgrade predictor**

Interfejsi:

- **Northbound interface** – integracija sa OSS putem web servera i file transfera, pristup NA
- **Southbound interface** - integracija sa pristupnom opremom
- **Multivendor Plug-in (MVP) interface** - rad na uređajima drugog vendedora

Realizacija NA u mreži TS

- Virtuelna infrastruktura



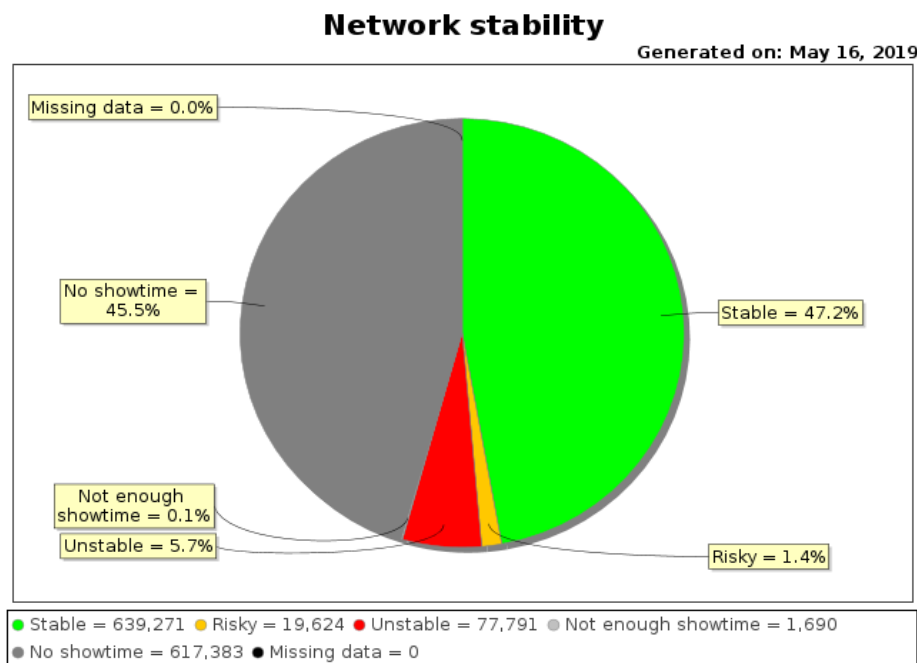
Procena kvaliteta linije

Kolektori: prikupljaju podatke s linije u periodima od 15 minuta i 24 časa

Kriterijum za kvalitet: stabilnost linije

- Na dnevnom nivou:
 - MTBE:
 - Video (DS) – stabilno 180 s, nestabilno 170 s;
 - Data (DS) - stabilno 6 s, nestabilno 2 s.
 - MTBR:
 - Video – stabilno 12 h, nestabilno 6 h;
 - Data (DS) – stabilno 6h, nestabilno 3 h.
- Na nedeljnom nivou:
 - Računa srednju vrednost parametara na dnevnom nivou za period od sedam dana.
- Za dati period: uprosečena vrednost za max 12 nedelja

Network assessment



- Network analyzer daje prikaz stabilnosti mreže na osnovu prikupljenih podataka na dnevnom nivou.

LSD (Line State Diagnosis)

- Koristi se za rešavanje problema konektivnosti i degradacije performansi (na osnovu podataka u trenutku izvršenja).
- Daje statičku sliku ponašanja linije na osnovu istorijskih podataka i trenutnog ponašanja.

- Pokreće se unošenjem ID porta:

B-KOSANCICEV_VENAC-ISV-1:1-1-6-14

B-REPISTE-MA-1:1-0-0-20

- Tabovi u LSD se odnose na izabrani port:
 - Summary
 - Diagnosis management
 - SELT management - prikazuje dosadasnje urađene SELT analize
 - Event history – istoriju događaja na portu za koji je rađena inspekcija
 - Configuration – konfiguraciju porta vezano za DLM

LSD (Line State Diagnosis) - Summary

Summary

Diagnosis management

SELT management

Event history

Configuration

Line state diagnosis report for B-NOVI_BEOGRAD-ISV-8:1-1-2-9 at 5/16/19 8:43 PM (stored status)

Description	
Customer ID	STOJANAC_BOSKO#2130778
Physical profile	LINERATE_6144_INT / ADSL_ALL_SKRIPTA
Virtual profile	Unavailable
Vect fallback profile	
Service Template	default Internet
Service template resolution	Default
Card type	NALT-C
DSL type	ADSL2plus (G.992.5 Annex A non-overlapped) over POTS (B-NOVI_BEOGRAD-ISV-8:1-1-2-9)
CPE type	HG530
Binder(s)	n/a or not available
Actual rate adaptation mode	US : Automatic, DS : Automatic
Vect status	n/a or Not configured
Actual CPE VECT type	
Supported CPE VECT types	
DSL status	Up
Last status change	5/16/19 8:42 PM
DELT estimated distance	1.707 km
Electrical Length	Not applicable
Actual AELE mode	Not applicable (VDSL2 only)

Diagnosis control

Dashboard

SELT

Short diagnosis

Diagnosis

Validation

Reinitialize

Classification history

	5/7/19	5/9/19	5/11/19	5/13/19	5/15/19
Service quality					
xDSL performance					
Show-time	4h	23h59	23h58	23h59	23h59
Inspection					
DLM state					

Upgrade Prediction

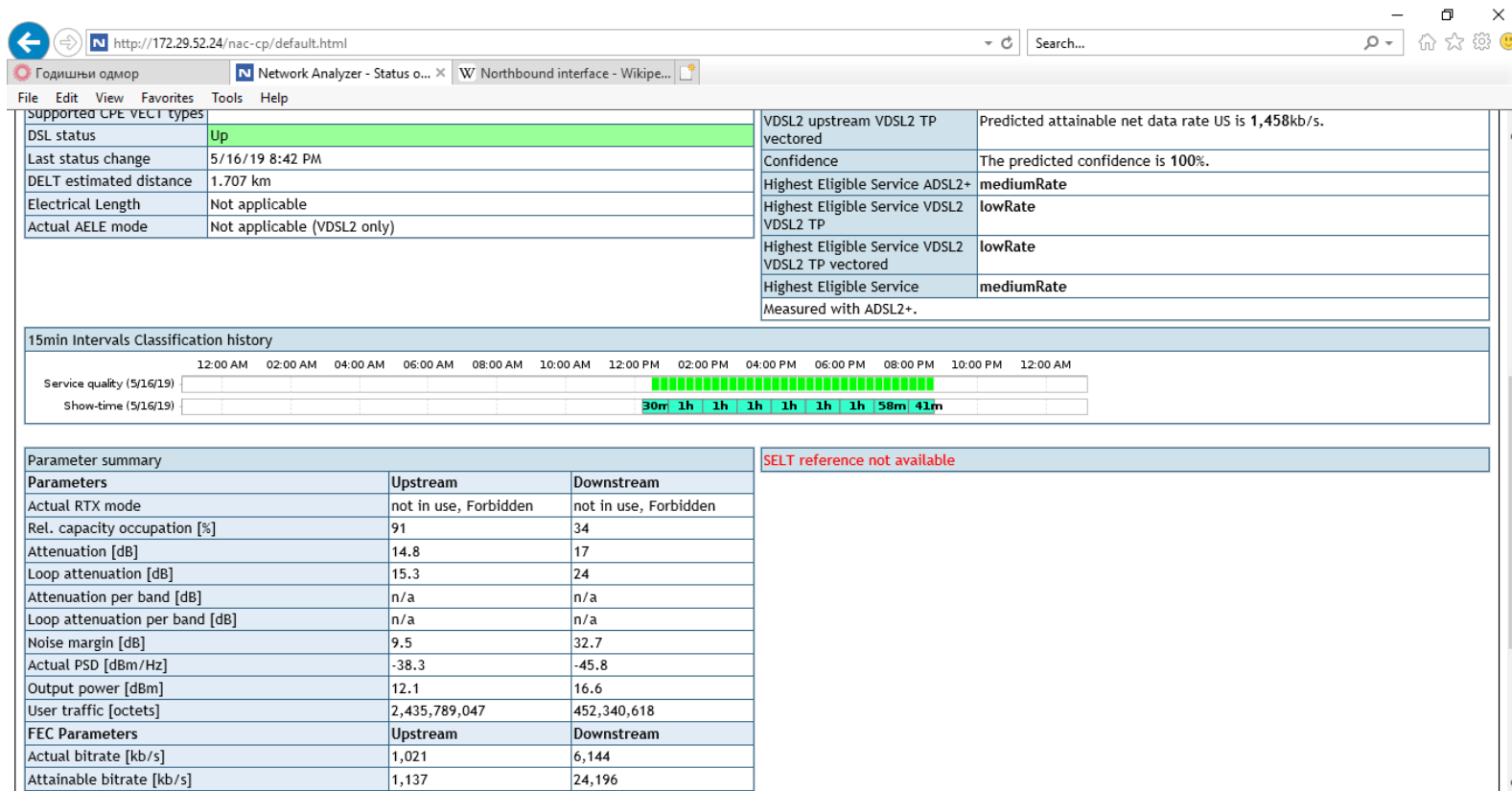
5/16/19 1:33 AM

ADSL2+ downstream	From modem estimated attainable net data rate DS 24,104kb/s to predicted attainable net data rate DS 18,411kb/s (a gain of -24%).
VDSL2 downstream VDSL2 TP	From modem estimated attainable net data rate DS 24,104kb/s to predicted attainable net data rate DS 12,544kb/s (a gain of -48%).
VDSL2 upstream VDSL2 TP	Predicted attainable net data rate US is 1,458kb/s.
VDSL2 downstream VDSL2 TP vectored	From modem estimated attainable net data rate DS 24,104kb/s to predicted attainable net data rate DS 12,544kb/s (a gain of -48%).
VDSL2 upstream VDSL2 TP vectored	Predicted attainable net data rate US is 1,458kb/s.
Confidence	The predicted confidence is 100%.
Highest Eligible Service ADSL2+	mediumRate
Highest Eligible Service VDSL2 VDSL2 TP	lowRate
Highest Eligible Service VDSL2 VDSL2 TP vectored	lowRate
Highest Eligible Service	mediumRate
Measured with ADSL2+.	

15min Intervals Classification history

Windows taskbar

23:55 16.05.2019



LSD (Line State Diagnosis)-Summary



- U polju "Classification history" su prikazani:
 - Service stability i DSL performance u prethodnih x dana (difoltno je 10).
 - Podebljane uspravne linije (broj 1) ukazuju da je došlo do promene profila.
 - Prevlačenjem miša preko grafa za Service stability i DSL performance prikazuje se naziv profila (broj 2).
 - Prevlačenjem miša preko grafa za DLM state prikazuje se njegova vrednost (operations, impaired, waiting for switch) (broj 3).
 - Inspection prikazuje kada su vršene provere linije

LSD (Line State Diagnosis)-Summary

- U odeljku Diagnosis control može se pokrenuti neka od sledećih inspekcija, na istom portu:
 - Dashboard
 - SELT
 - Short diagnosis
 - Diagnosis
 - Validation

LSD (Line State Diagnosis) - Dashboard

Daje izgled DSL-a u realnom vremenu – promene vrednosti parametara ili nove probleme/events. Na osnovu toga se korisnik može uputiti da uradi određenu akciju, pri čemu se odmah vide njene posledice.

Dashboard J-NEG_KARAPANDZINA_V8-MAS-1:1-0-3-14



LSD (Line State Diagnosis)-Summary

Short diagnosis

- Na zahtev korisnika, prikuplja i analizira DSL port u kraćem vremenskom intervalu (default 1 minut), što je dovoljno da se generišu svi DSL parametri.
- Napomena: ovo je kratak period za pouzdanu dijagnozu. Zato, ako se pojavi tabela “Detected problems”, treba je odbaciti i uraditi LQD (Line quality diagnosis) u automatic collection modu.
- Koristi se da se dobije stanje linije u kratkom vremenskom roku

LSD (Line State Diagnosis)-Summary

Short diagnosis

Status of 'Short line quality diagnosis' inspection (1,316) launched on line B-KOSANCICEV_VENAC-ISV-1:1-1-6-13

[Port de

Short line quality diagnosis report for B-KOSANCICEV_VENAC-ISV-1:1-1-6-13 (inspection launched by admin)	
Description	
Customer ID	BELIC_SLOBODAN#3284922
Physical profile	TP_12M_LP / ADSL_ALL_SKRIPTA_NO_RFI
Virtual profile	Unavailable
Vect fallback profile	
Service Template	default Internet
Service template resolution	Default
Card type	NALT-C
DSL type	ADSL2plus (G.992.5 Annex A non-overlapped) over POTS
CPE type	Unknown
Vect status	n/a or Not configured
Actual CPE VECT type	
Supported CPE VECT types	
Estimated vect gain DS [kb/s]	
Estimated vect gain US [kb/s]	
Service stability	Undetermined
DELT estimated distance	1.143 km
Electrical Length	Not applicable (VDSL2 only)
Start time	9/28/13 11:23 AM
Stop time	9/28/13 11:24 AM
State	Finished

Diagnosis control	
Dashboard	Diagnosis
Restart diagnosis	Validation
CSV export	RAW export
Regenerate	
Classification history	
	9/18/13 9/20/13 9/22/13 9/24/13 9/26/13 9/28/13
Service stability	
xDSL performance	
Show-time	24h 24h 24h 24h 24h 24h
Inspection	24h 24h 24h 24h 24h 24h
DLM state	11h22

LSD (Line State Diagnosis)-Summary

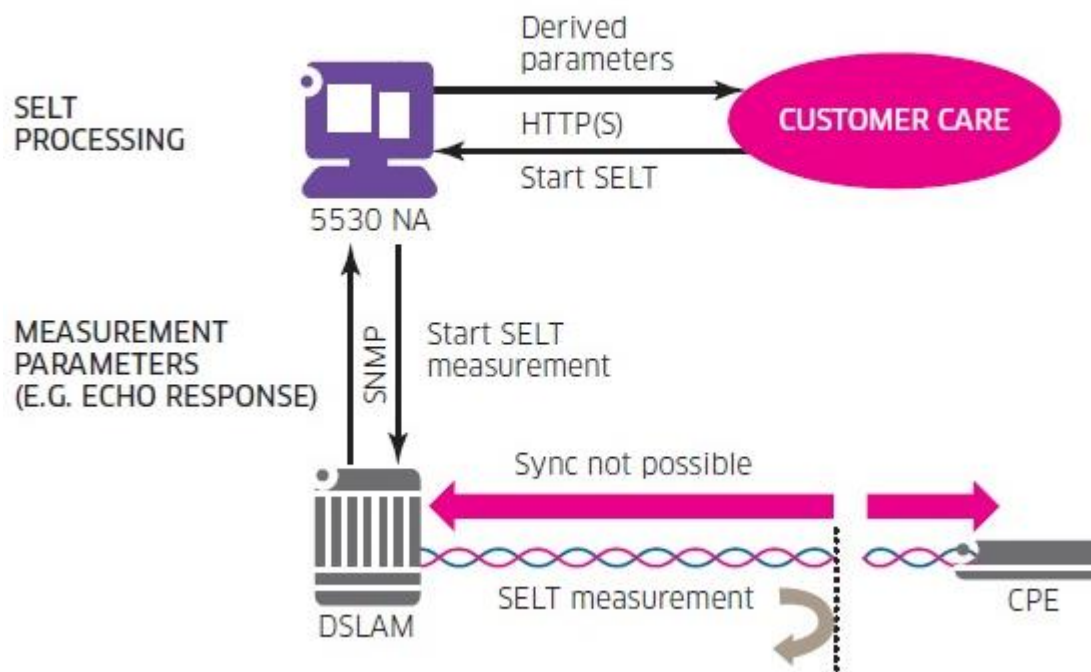
LQD (Line Quality Diagnosis)

- Služi za rešavanje kompleksnijih problema u kvalitetu servisa. Detektuje nestabilnost, statičke probleme, probleme promenljive u vremenu i fizičke probleme na liniji.
- Moguća su 2 moda inspekcije:
 - Automatska - neophodno 6h showtime (podešeno u sistemskim parametrima)
 - Forsirana - korisnik sistema podešava vreme kolekcije podataka
- NA koristi pragove definisane u pridruženom servisnom templejtu da detektuje degradaciju kvaliteta servisa (stabilnost servisa), a za fizički problem daje analizu DSL parametara.
- Omogućava detaljniju analizu kvaliteta linije (SNR, QLN, Hlog, FEC (down/up), Bitrate (up/down), User traffic, CV, Errored seconds, Severely errored seconds, Noise margin (up/down), LEFTRS, Output power, Attenuation)

LSD (Line State Diagnosis)-Summary SELT (Single-End Line Testing)

- Detektuje i lokalizuje probleme vezane za konektivnost.
- NA zahteva SELT test od DSL uređaja.
- Zahteva prekid servisa ukoliko je aktivan na liniji, i po završetku testa, vrši se restore linije na prethodno stanje
- DSLAM prosleđuje podatke NA-u, gde ih SELT *interpretation unit* dalje analizira.
- Kao izvedeni parametri dobijaju se: kapacitet u up/down, dužina petlje, slabljenje na liniji, termination type i lociranje bridge tap (uklanjanjem bridge tap povećava se kapacitet petlje).

LSD (Line State Diagnosis)-Summary SELT (Single-End Line Testing)



LSD (Line State Diagnosis)-Summary

SELT (Single-End Line Testing)

SELT analysis result for MA5600T_TEST:1-0-5-15 (analysis launched by admin)

Inspection details			
Description			
Reliability		High	
Analysis results		Current	
		Loop estimate	
Measurement timestamp		9/27/13 2:08 PM	
Sync status before Selt inspection		Down	
Termination type		Unknown	
Length		3420 m [+/-] 350 m	
Attenuation @ 300 kHz		47.4 dB	
Capacity		Capacity not estimated	
Bridged tap		Bridged tap detection not enabled	
Metallic fault		Metallic fault detection not enabled	
Upstream attenuation measured by DELT		n/a	
Upstream attenuation estimated by SELT		33.9 dB, default POTS line type used	
SELT reflections			
Type		Location	Magnitude
Unknown		3420 m [+/-] 350 m	-70.0 dB
Detected problems			
Confidence	Impact	Description	Proposed repair actions
100%	No connectivity.	The equipment was administrative down.	Unlock the port.
50%	No connectivity.	There is a loop impairment at 3420.0 m from the DSLAM	Fix the open/ short circuit
50%	No impact specified.	No CPE connected or CPE switched off	Verify that the CPE is connected and turned on

LSD (Line State Diagnosis)-Summary Validation

- Pokreće se na liniji da verifikuje da li je prihvatljiva stabilnost pre aktivacije servisa ili da se verifikuje repair action. Vremenski interval se definiše u service template (difoltno 4 sata, a najviše 7 dana).
- Rezultati se vide na stranici diagnosis management u koloni status (ok ili nok)

LSD (Line State Diagnosis)-Diagnosis management

Status of B-KOSANCICEV_VENAC-ISV-1:1-1-6-13

Summary Diagnosis management SELT management Event history Configuration

Showing row

Id	State	Progress	Status	Description	Customer ID	Inspection type	Resource	User name	Start time	Stop time
*	*		*	*	*	*	*	*		
1317	Monitoring				BELIC_SLOBODAN#3284922	Line quality diagnosis	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/28/13 12:01 PM	9/29/13 12
1316	Finished				BELIC_SLOBODAN#3284922	Short line quality diagnosis	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/28/13 11:23 AM	9/28/13 11
1315	Finished				BELIC_SLOBODAN#3284922	Line state diagnosis	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/28/13 11:05 AM	9/28/13 11
1314	Finished				BELIC_SLOBODAN#3284922	Dashboard	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/27/13 11:31 PM	9/27/13 11
1274	Finished					Line quality validation	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/26/13 9:50 PM	9/27/13 8:
1269	Failed				BELIC_SLOBODAN#3284922	SELT	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/26/13 10:52 AM	9/26/13 10
1268	Finished				BELIC_SLOBODAN#3284922	Line state diagnosis	B-KOSANCICEV_VENAC-ISV-1:1-1-6-13	admin	9/26/13 10:52 AM	9/26/13 10

Filter Cancel matching Delete matching Export matching

- Vidimo inspekcije koje su do sada vršene nad datim portom.

LSD (Line State Diagnosis) - SELT management

Status of B-VRANIC-ISV-1:1-1-2-11

Summary Diagnosis management SELT management Event history Configuration										
										Showing n
Id	State	Progress	Status	Description	Customer ID	Inspection type	Resource	User name	Start time	Stop
*	*		*	*	*	*	*	*		
2232	Finished				MIHAILOVIC_SRDAN#8332050	SELT	B-VRANIC-ISV-1:1-1-2-11	admin	11/6/13 5:21 PM	11/6
2231	Finished				MIHAILOVIC_SRDAN#8332050	Line state diagnosis	B-VRANIC-ISV-1:1-1-2-11	admin	11/6/13 5:21 PM	11/6
Filter Cancel matching Delete matching Export matching										

- SELT management - prikazuje dosadasnje uradene SELT analize.

LSD (Line State Diagnosis) - Event history

Status of B-MIRIJEVO-ISV-8:1-1-13-14

Summary Diagnosis management SELT management Event history Configuration

Showir

Time ▲	User name	Field	Old value	New value	Comment
11/28/13 2:08 AM	system	DLM state	Validation	Operations	Line sync health ok, going back to operations
11/28/13 2:01 AM	nbi	Virtual profile	TP_7M_LP_VIRT	DLM_TP_7M_LP_1_VIRT	
11/28/13 2:01 AM	nbi	DLM state	Waiting for switch	Validation	
11/27/13 4:09 AM	system	DLM state	Operations (entry)	Waiting for switch	Service quality unstable or risky : next profile DLM_TP_7M_LP_1_VIRT
11/26/13 4:58 PM	admin	DLM state	Disabled	Operations (entry)	
11/26/13 4:58 PM	admin	DLM state	Failed	Disabled	
11/14/13 4:09 AM	system	Service profile	DLM_TP_10M_LP_3	TP_7M_LP	External profile switch discovered
11/14/13 4:09 AM	system	Service template	default Internet	TP_7M_LP	Auto resolution to different service template
11/14/13 4:09 AM	system	Service template resolution type	Default	Resolved (automatically)	Auto resolution to different service template
10/26/13 4:09 AM	system	DLM state	Operations (entry)	Failed	No virtual profile found
10/25/13 4:22 PM	admin	DLM state	Disabled	Operations (entry)	
10/9/13 4:09 AM	system	Service template	TP_10M_LP	default Internet	Auto resolution to different service template
10/8/13 3:20 PM	guest	DLM state	Failed	Disabled	
10/8/13 3:20 PM	system	Service template	default Internet	TP_10M_LP	
10/8/13 4:09 AM	system	DLM state	Impaired	Failed	No virtual profile found
10/8/13 4:08 AM	system	Service template	TP_10M_LP	default Internet	Auto resolution to different service template
10/8/13 4:08 AM	system	Service template resolution type	Resolved (automatically)	Default	Auto resolution to different service template
9/10/13 9:31 AM	system	Service provider	DLM1	DLM1_bojana	
8/28/13 2:43 PM	system	Service provider		DLM1	

- Event history – istorija događaja na portu za koji je rađena inspekcija.

LSD (Line State Diagnosis) - Configuration

Status of B-MIRIJEVO-ISV-8:1-1-13-14

Summary Diagnosis management SELT management Event history Configuration

Port

⚠ Changing service templates is not advisable in the current DLM state! Move the port to disabled first.

Label:	
Label2:	
Virtual profile:	DLM_TP_7M_LP_1_VIRT
Service template:	TP_7M_LP v
Service template resolution:	Resolved (automatically) v
Service provider:	DLM1_bojana v
DLM state:	Operations
Loop name	Not defined

Configuration – prikazuje konfiguraciju porta vezano za DLM

Diagnosis Management – inspekcije na različitim portovima

- Diagnosis → Diagnosis Management :
 - Prikazuje  svih inspekcija.
 - Klikom na (View) vide se detalji inspekcije.
 - Status:
 - Zelena - označava dobru stabilnost kod LQD inspekcije
 - Crvena - označava lošu stabilnost kod LQD inspekcije

Diagnosis Management

Diagnosis management

Current inspections [Import](#)

Showing row 221 to

Id	State	Progress	Status	Description	Customer ID	Inspection type	Resource	User name	Start time	Stop ti
* * *	▼		* ▼ *		*	* ▼ *	*	*		
2630	Finished				KIZIC_MARKO#6411208	Line state diagnosis	S-KLISA-MA-1:1-0-11-49	admin	11/18/13 7:39 PM	11/18/
2629	Finished				S-Sremska_Kamenica-MA-1/0/0/12	Line state diagnosis	S-SIRIG-MAT-1:1-0-0-12	admin	11/18/13 7:39 PM	11/18/
2628	Finished				PETROVIC_ZIVORAD#8650318	Line state diagnosis	B-RIPANJ-MA-1:1-0-1-38	admin	11/18/13 7:36 PM	11/18/
2627	Finished				DORDEVIC_ZVONIMIR#3322807	Line state diagnosis	B-BORCA-MA-1:1-0-3-46	admin	11/18/13 7:35 PM	11/18/
2626	Finished					Line state diagnosis	B-SAJAM-MA-1:1-0-14-10	admin	11/18/13 7:10 PM	11/18/
2625	Finished				Krstic_Role_572387_Telekom_Malop	Line state diagnosis	J-ALEKSINAC-MA-2:1-0-10-4	admin	11/18/13 6:49 PM	11/18/
2624	Finished				ZIVKOV_SAVA#675505	Dashboard	B-SAMOS-ISV-1:1-1-2-23	admin	11/18/13 3:16 PM	11/18/
2623	Finished				B-Krnjaca-MA-1/0/2/19	Short line quality diagnosis	B-KRNJACA-MA-1:1-0-2-19	admin	11/18/13 9:54 AM	11/18/
2622	Finished				B-Krnjaca-MA-1/0/2/19	Line state diagnosis	B-KRNJACA-MA-1:1-0-2-19	admin	11/18/13 9:54 AM	11/18/
2621	Finished					Line state diagnosis	B-BLOK_23-MAT-1:1-0-12-33	admin	11/18/13 9:53 AM	11/18/
2620	Finished				B-Krnjaca-MA-1/0/2/19	Line state diagnosis	B-KRNJACA-MA-1:1-0-2-19	admin	11/18/13 9:51 AM	11/18/
2619	Finished				Milovanovic_Dejan_8121367	Line state diagnosis	B-LAZAREVAC-ISV-1:1-1-16-40	admin	11/18/13 1:10 AM	11/18/
2618	Finished				KOKIR_BORA	Line state diagnosis	B-MIRIJEVO-IS-4:1-1-3-9	admin	11/18/13 12:55 AM	11/18/
2617	Finished				ELMAZI_IBRAHIM#3165621	Line state diagnosis	B-ZEMUN-ISV-7:1-1-17-18	admin	11/18/13 12:46 AM	11/18/
2616	Finished				KOSOVAC_NIKOLA:671102	Line state diagnosis	B-CREPAJA-ISP-1:1-1-10-19	admin	11/18/13 12:36 AM	11/18/
2615	Finished				B-Repiste-MA-1/0/0/1	Line state diagnosis	B-REPISTE-MA-1:1-0-0-1	admin	11/17/13 4:29 PM	11/17/
2614	Finished				MARINKOVIC_MILANKA#2395127	Line state diagnosis	B-REPISTE-MA-1:1-0-0-0	admin	11/17/13 4:29 PM	11/17/
2613	Finished				B-Krnjaca-MA-1/0/2/19	Short line quality diagnosis	B-KRNJACA-MA-1:1-0-2-19	admin	11/17/13 3:50 PM	11/17/
2612	Finished				B-Krnjaca-MA-1/0/2/19	Line state diagnosis	B-KRNJACA-MA-1:1-0-2-19	admin	11/17/13 3:41 PM	11/17/
2611	Finished				S-Zrenjanin_1-MA-2/0/2/8	Line state diagnosis	S-ZRENJANIN_CENTAR-MA-2:1-0-2-8	admin	11/16/13 3:32 PM	11/16/

[Filter](#)

[Cancel matching](#)

[Delete matching](#)

[Export matching](#)

Report management

- Prikaz svih izveštaja.
- Aktivni izveštaji se generišu svakog dana. Vreme početka i kraja generisanja izveštaja se podešava u System settings (trenutno je podešeno 0-20h).

Report management

Current reports

Showing 10

Id	Report template	Filter definition	Period	RT state	Report state	Start Time	Stop Time	Filter changed	ST change
*	"Default report template"	*	*	*	*			*	
305	Default report template	Empty filter	Previous (9/8/13 - 9/15/13)	Active	Ready	10/18/13 1:01 PM	10/18/13 1:01 PM	False	True
332	Default report template	Empty filter	Previous (9/15/13 - 9/22/13)	Active	Ready	10/18/13 12:52 PM	10/18/13 12:53 PM	False	True
360	Default report template	Empty filter	Previous (9/22/13 - 9/29/13)	Active	Ready	10/18/13 12:44 PM	10/18/13 12:44 PM	False	True
402	Default report template	Empty filter	Previous (9/29/13 - 10/6/13)	Active	Ready	10/18/13 12:37 PM	10/18/13 12:37 PM	False	True
420	Default report template	Empty filter	Previous (10/6/13 - 10/13/13)	Active	Ready	10/15/13 10:17 AM	10/15/13 10:17 AM	False	True
438	Default report template	Empty filter	Previous (10/13/13 - 10/20/13)	Active	Ready	10/20/13 12:12 AM	10/20/13 12:13 AM	False	True
482	Default report template	Empty filter	Previous (10/20/13 - 10/27/13)	Active	Ready	10/27/13 12:12 AM	10/27/13 12:12 AM	False	True
567	Default report template	Empty filter	Previous (10/27/13 - 11/3/13)	Active	Ready	11/18/13 11:05 PM	11/18/13 11:05 PM	False	True
592	Default report template	Empty filter	Previous (11/3/13 - 11/10/13)	Active	Ready	11/18/13 10:57 PM	11/18/13 10:57 PM	False	True
656	Default report template	Empty filter	Previous (11/10/13 - 11/17/13)	Active	Ready	11/18/13 10:49 PM	11/18/13 10:49 PM	False	True
774	Default report template	Empty filter	Previous (11/17/13 - 11/24/13)	Active	Ready	11/28/13 1:35 PM	11/28/13 1:35 PM	False	True
833	Default report template	Empty filter	Previous (11/24/13 - 12/1/13)	Active	Ready	12/1/13 12:13 AM	12/1/13 12:13 AM	False	False
851	Default report template	Empty filter	Current (12/1/13 - 12/8/13)	Active	Ready	12/3/13 12:07 AM	12/3/13 12:07 AM	False	False

Report management

- Primer izveštaja sa podatkom da li su validacijom konstatovane linije se degradacijom performansi, prikazano po IPAN-ima

Node	Node selector	IP address	Prequalification NOK	Number of active ports
*	*			
B-ADA-UA-1	IJ_Beograd	172.20.132.128	9 (7%)	120
B-AERODROM-ISV-1	IJ_Beograd	172.22.1.121	6 (2%)	221
B-AKADEMIJA-IS-1	IJ_Beograd	172.22.1.196	28 (3%)	768
B-AKADEMIJA-IS-2	IJ_Beograd	172.22.1.201	29 (3%)	742
B-AKADEMIJA-IS-3	IJ_Beograd	172.22.1.202	21 (2%)	768
B-AKADEMIJA-ISV-4	IJ_Beograd	172.22.1.197	17 (2%)	773
B-AKADEMIJA-ISV-5	IJ_Beograd	172.22.1.198	19 (2%)	720
B-ALBANSKE_SPOMENICE-MAT-1	IJ_Beograd	172.20.130.5	11 (1%)	640
B-ALTINA_1-MA-1	IJ_Beograd	172.20.139.4	1 (0%)	832
B-ALTINA_1-MA-2	IJ_Beograd	172.20.139.9	0 (0%)	448
B-ALTINA_2-IS-1	IJ_Beograd	172.22.1.177	0 (0%)	701
B-AUTOKOMANDA-IS-1	IJ_Beograd	172.22.2.150	27 (4%)	662
B-AUTOKOMANDA-ISV-2	IJ_Beograd	172.22.2.156	6 (0%)	648
B-AVALA-MAT-1	IJ_Beograd	172.20.140.4	55 (7%)	704
B-AVALSKI_CVET-ISVM-1	IJ_Beograd	172.22.5.102	3 (1%)	288
B-BABE-ISV-1	IJ_Beograd	172.21.66.24	1 (1%)	87
B-BALJEVAC-ISV-1	IJ_Beograd	172.22.3.136	2 (2%)	96
B-BALKANSKA-MA-1	IJ_Beograd	172.20.137.2	116 (18%)	640
B-BALKANSKA-MA-2	IJ_Beograd	172.20.137.5	6 (3%)	176
B-BANJICA_1-ISV-1	IJ_Beograd	172.22.3.102	11 (1%)	552

DLM (dynamic line management)

Konfigurisanje virtuelnih profila:

- virtuelni linijski profili koji su identični linijskim profilima u produkciji
- DLM virtuelni linijski profili koji se povezuju sa service template i linijskim profilima

Report Range: 31 Days

Service Template filter:

Selected values:

- BOX_6M
- default Data
- default Gaming
- default Internet
- default Video
- default VoIP
- demo
- DLM_Dummy

Unselected values:

Virtual Profile filter:

Selected values:

- DLM_LINERATE_10M_2_VIRT
- DLM_LINERATE_10M_3_VIRT
- DLM_LINERATE_10M_4_VIRT
- DLM_LINERATE_1536_1_VIRT
- DLM_LINERATE_1536_2_VIRT
- DLM_LINERATE_1536_3_VIRT
- DLM_LINERATE_16384_1_VIRT
- DLM_LINERATE_16384_2_VIRT

Unselected values:

Node Selector filter:

Selected values:

- All nodes
- B-AKADEMIJA-IS-1
- ISAM_only

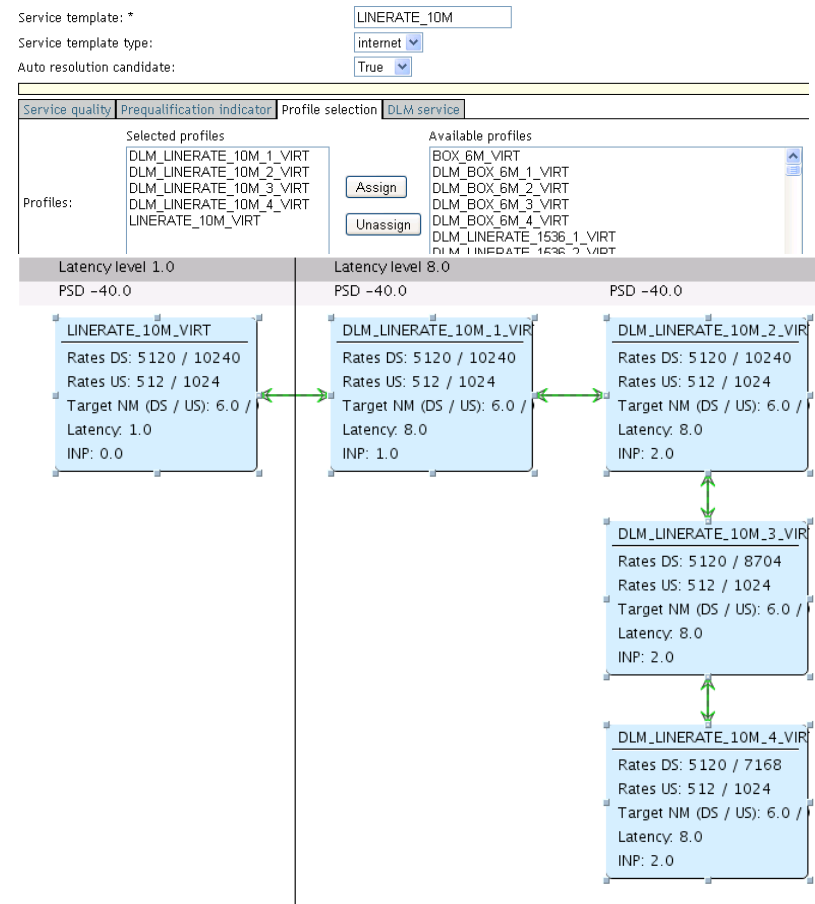
Unselected values:

Regenerate graphs

- Za svaku kombinaciju servisa postoji po jedan Service template
- Sadrži pragove za procenu kvaliteta servisa :
 - min i max rate za DS i US, kašnjenje, PSD (dBm/Hz) itd.

DLM (dynamic line management) Service template

- DLM profili su profili koje NA automatski pridružuje liniji u procesu optimizacije
- Za svaki service template definisana je hijerarhija pridruživanja DLM virtuelnih linijskih profila (redosled promena profila u slučaju narušenih performansi)



Ports management

- Daje listu portova sa odgovarajućim DLM stanjem, virtuelnim profilom i *service template*.

Port management

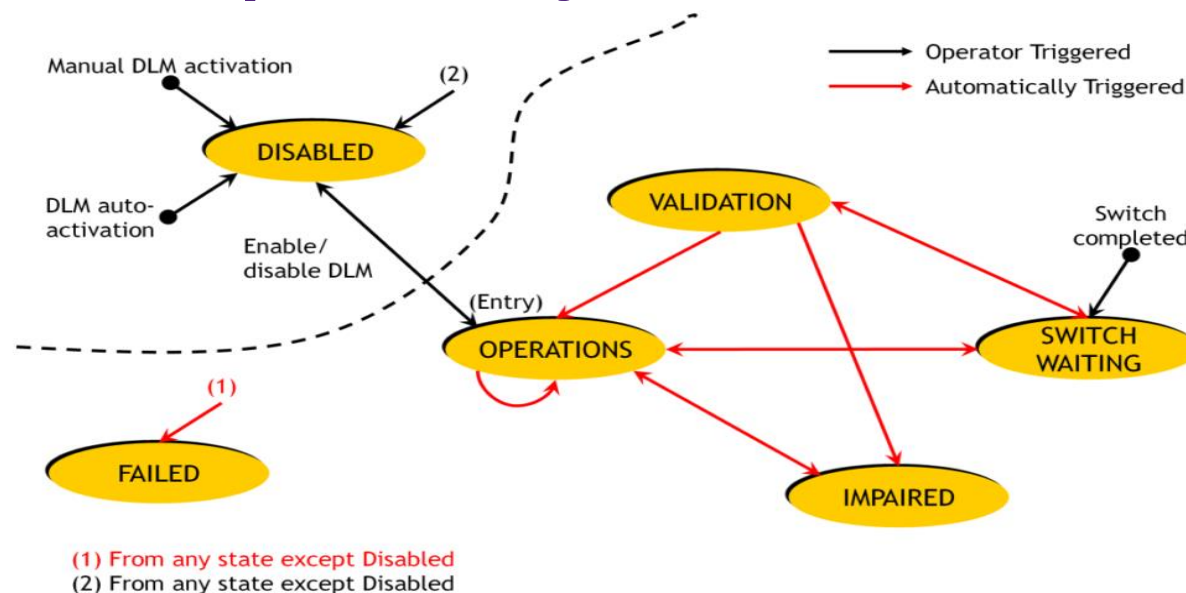
Ports [Bulk operations](#) [Ports history](#)

Showing row

	Line address	User label1	User label2	Virtual profile	Service template	Service template resolution	DLM state	Service provide
	*	*	*	*	*	*	*	*
	B-KONJARNIK-IS-3:1-1-1-1			TP_12M_LP_VIRT	TP_12M_LP	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-2			LINERATE_10M_VIRT	LINERATE_10M	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-3			LINERATE_5120_VIRT	LINERATE_5120	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-4			LINERATE_5120_VIRT	LINERATE_5120	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-5			LINERATE_4096_VIRT	LINERATE_4096	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-6				default Internet	Default	Disabled	
	B-KONJARNIK-IS-3:1-1-1-7			LINERATE_4096_VIRT	LINERATE_4096	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-8			TP_7M_LP_VIRT	TP_7M_LP	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-9			LINERATE_10M_VIRT	LINERATE_10M	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-10			LINERATE_5120_VIRT	LINERATE_5120	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-11			LINERATE_5120_VIRT	LINERATE_5120	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-12			LINERATE_20M_VIRT	LINERATE_20M	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-13			LINERATE_1536_VIRT	LINERATE_1536	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-14			TPNK_10M_LP_VIRT	TPNK_10M_LP	Resolved (automatically)	Disabled	
	B-KONJARNIK-IS-3:1-1-1-15				default Internet	Default	Disabled	
	B-KONJARNIK-IS-3:1-1-1-16			TPNK_18M_LP_VIRT	TPNK_18M_LP	Resolved (automatically)	Disabled	
	R-KONJARNIK-IS-3:1-1-1-17			I INFRATE 5120_VIRT	I INFRATE 5120	Resolved (automatically)	Disabled	

DLM (dynamic line management)

Proces optimizacije



Ostvaruje se kroz vezu sa OSS!

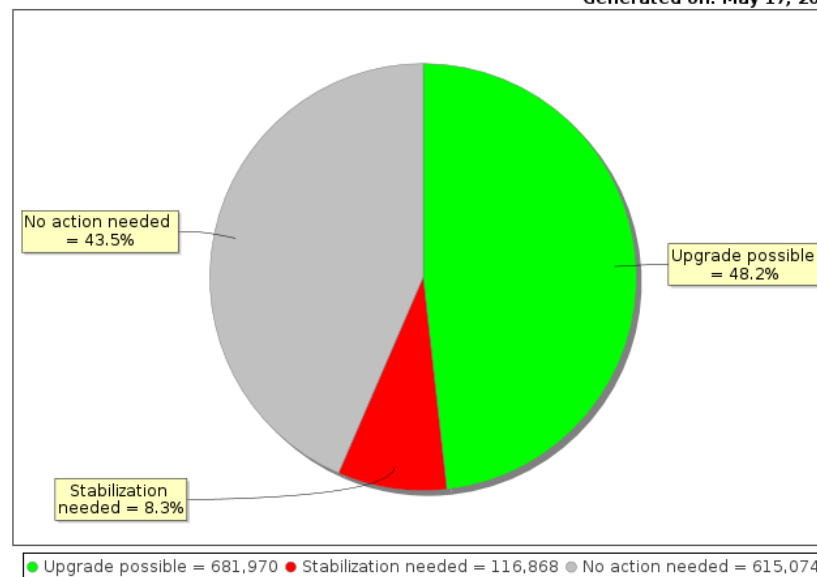
- Automatizovan proces kroz kojim se traži optimalni konfiguracioni profil na liniji, za dati servis, na osnovu izmerenih parametara linije, radi poboljšanja performansi i stabilnosti linije. Obezbeđuje maksimalnu moguću brzinu na liniji uz obezbeđen kvalitet servisa i performansi.
- DLM stanja: Disabled, Operations (Entry), Switch waiting, Validation, Impaired

Report management

- DLM service quality za sve linije

DLM service quality

Generated on: May 17, 2019



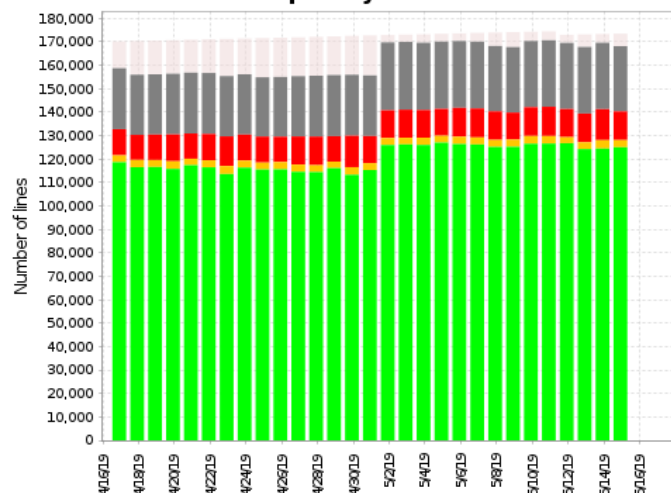
Category	Number	Export
Upgrade possible	681,970	Export
Stabilization needed	116,868	Export
No action needed	615,074	Export

Report management

- Reports for DLM enabled lines

DLM reports generation time: 5/17/19 1:35 AM

Service quality evolution



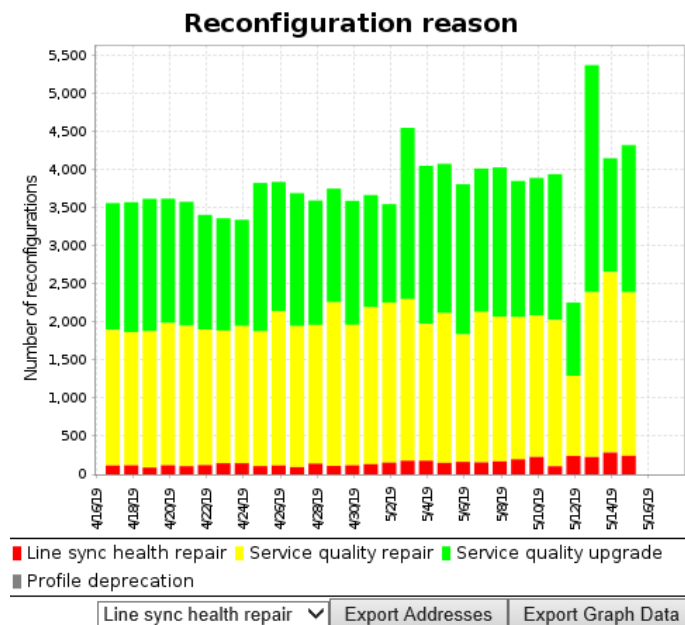
■ Stable
 ■ Risky
 ■ Unstable
 ■ Not enough showtime
 ■ No showtime
 ■ Missing data
 ■ Not collected

Unstable ▼
 Export Addresses
 Export Graph Data
 None

- DLM odlučuje o stabilnosti servisa na liniji na osnovu agregiranog kvaliteta servisa u predefinisanoj vremenskoj intervalu
- Dat je primer izveštaja na nivou svih linija uvučenih pod DLM – na četvordonevnom nivou.
- Posmatra se stabilnost ukupnog broja linija pod DLM-om.
- Vidljivo je da je 02.05.2019. broj stabilnih linija pod DLM-om povećan sa 120000 na 130000 linija.

Report management

- Reports for DLM enabled lines

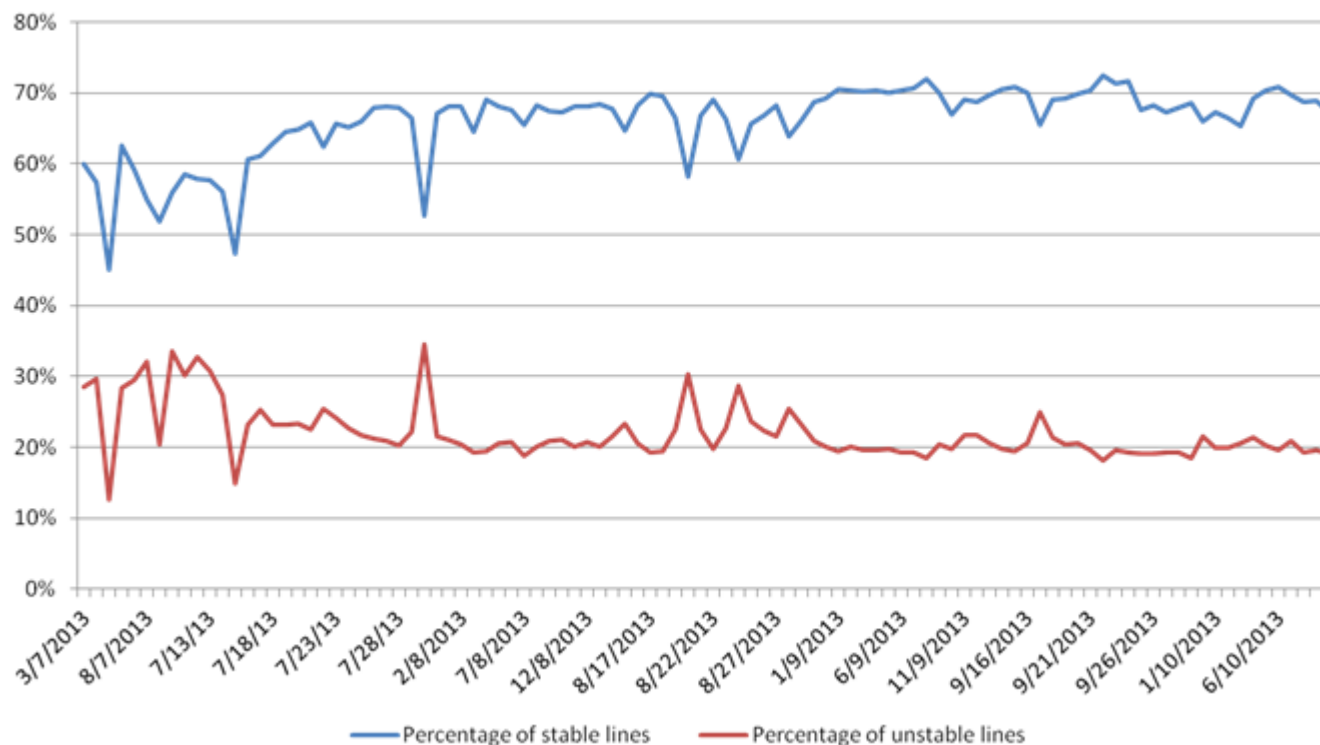


Dijagram označava broj linija za koje je potrebna optimizacija i razloge za optimizaciju:

- Učestali gubici sinhronizacije
- Konstatovana degradacija kvaliteta servisa
- Moguć upgrade kvaliteta servisa u okviru definisanih karakteristika linije
- Nemoguće detektovati uzrok

DLM reports

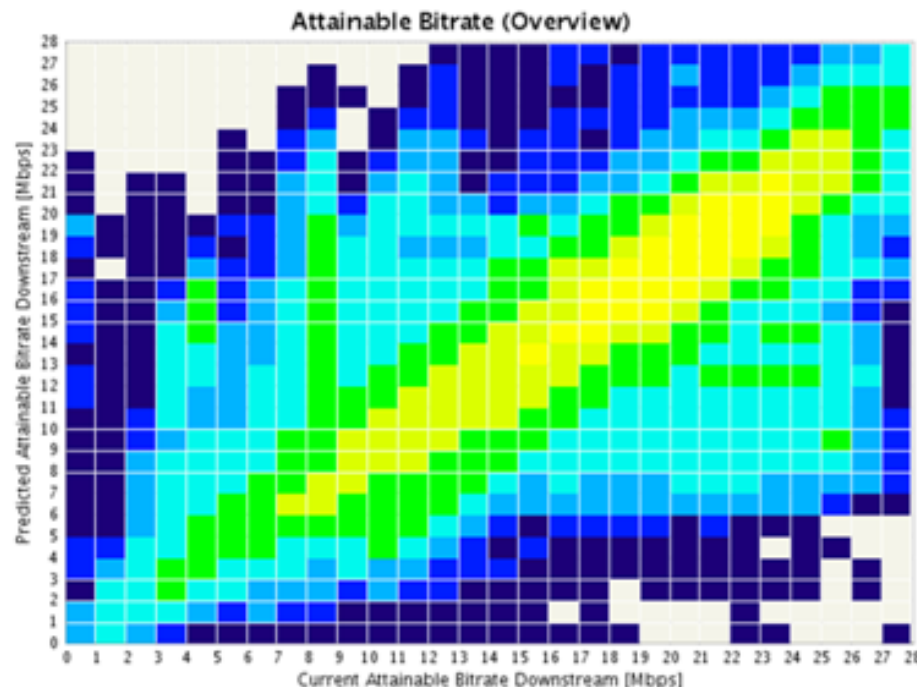
Percentage of lines – daily values



Upgrade predictor

- Upgrade predictor je deo extension platforme.
- Podaci potrebni za predikciju su kolektovani od strane kolektora u Network Analysis modulu na core platformi. Extension platforma prihvata ove podatke, usrednjava ih i smešta u svoju bazu podataka.
- Startovanjem Upgrade prediktora pokreće se algoritam za predikciju koji daje predikciju brzine na liniji.
- Ovi rezultati se prikazuju u okviru line state diagnosis na core platformi.

Upgrade predictor



Svetlija boja podrazumeva veći broj linija.

Primer predikcije ADSL2+ brzine na ADSL(2(2+)) linijama.

Predicted bitrate ima prednost u odnosu na attainable bitrate merenu od strane CPE jer vrši merenje za:

- kompletnu prenetu snagu signala
- ceo ADSL2+ spektar
- usrednjenu vrednost šuma

- Primena – kvalifikovanje linija za upgrade , ulazni podatak za CRM aplikacije

Upgrade predictor – veza sa TIS-om

- Ostvaruje se preko FTP servera
- U TIS-u su vidljivi sledeći podaci za postojeće BB korisnike:
 - ✓ trenutna DownStream i UpStream BB pristupna brzina
 - ✓ predikcija maksimalne DownStream BB brzine po ADSLu u slučajevima kada korisnik ima/nema IPTV uslugu
 - ✓ predikcija maksimalne DownStream i UpStream BB brzine po VDSLu

Upgrade predictor – veza sa TIS-om

Prediktivne brzine

PREDIKTIVNE BRZINE - NETWORK ANALYZER

Razdelnik	Vrsta rebra	Broj rebra	Parica
10014 Akademija1	A	147	175

BB Port: B-Akademija-ISV-4.R1.S1.LT11.22

Tip porta: ADSL Port (ADSL2+)

Ostvarive brzine:

ADSL DS HSI: 23199

ADSL DS IPTV: 20621

VDSL DS: 36676

VDSL US: 15385

Trenutne brzine:

DOWNSTREAM: 10239

UPSTREAM: 1021

Izlaz

- Izgled ekrana u TIS-u

Network diagnostics

- Proactive network diagnosis je deo extension platforme.
- Na osnovu prikupljenih dnevnih podataka prikazuje moguće probleme na liniji. Odluka se zasniva na binarnom principu. Ako je proračunata pouzdanost postojanja nekog problema $\geq 60\%$ prijavljuje detektovani problem (ispisuje se i u okviru core platforme - Line state diagnosis), a ako je manja ne prikazuje problem.

Problems summary

	Bridged Tap
	Capacitive Coupling
	Impulse Noise
	Impulse Noise DownStream
	Impulse Noise UpStream
	Intermittent Contact
	Modem Interoperability
	Missing Alarm Splitter
	Non Interop List
	Missing POTS Splitter
	Unbalanced Loop
	Untwisted Wires
	Varying Noise DownStream
	Varying Noise UpStream
	In House Capacitor
	Abnormal Crosstalk
	PSURFI DS
	PSURFI US
	Bad Contact in the Middle of the Loop

Network diagnostics

Port Name: B-KONJARNIK-IS-3:1-1-1-8 Loop Name:

View LQD

Clear accumulated problems

Delete Port

Configured Binders

Virtual Binders

Time of Last Reported Problem				November					December			
Snapshot	LQD	Accumulated		24	25	26	27	28	29	30	1	2
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	10/11/13 7:46 PM									
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	-									
	12/2/13 7:46 PM	-	12/2/13 7:46 PM	-	!	!	!	!	!	!	!	!
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	-									
	-	-	-									

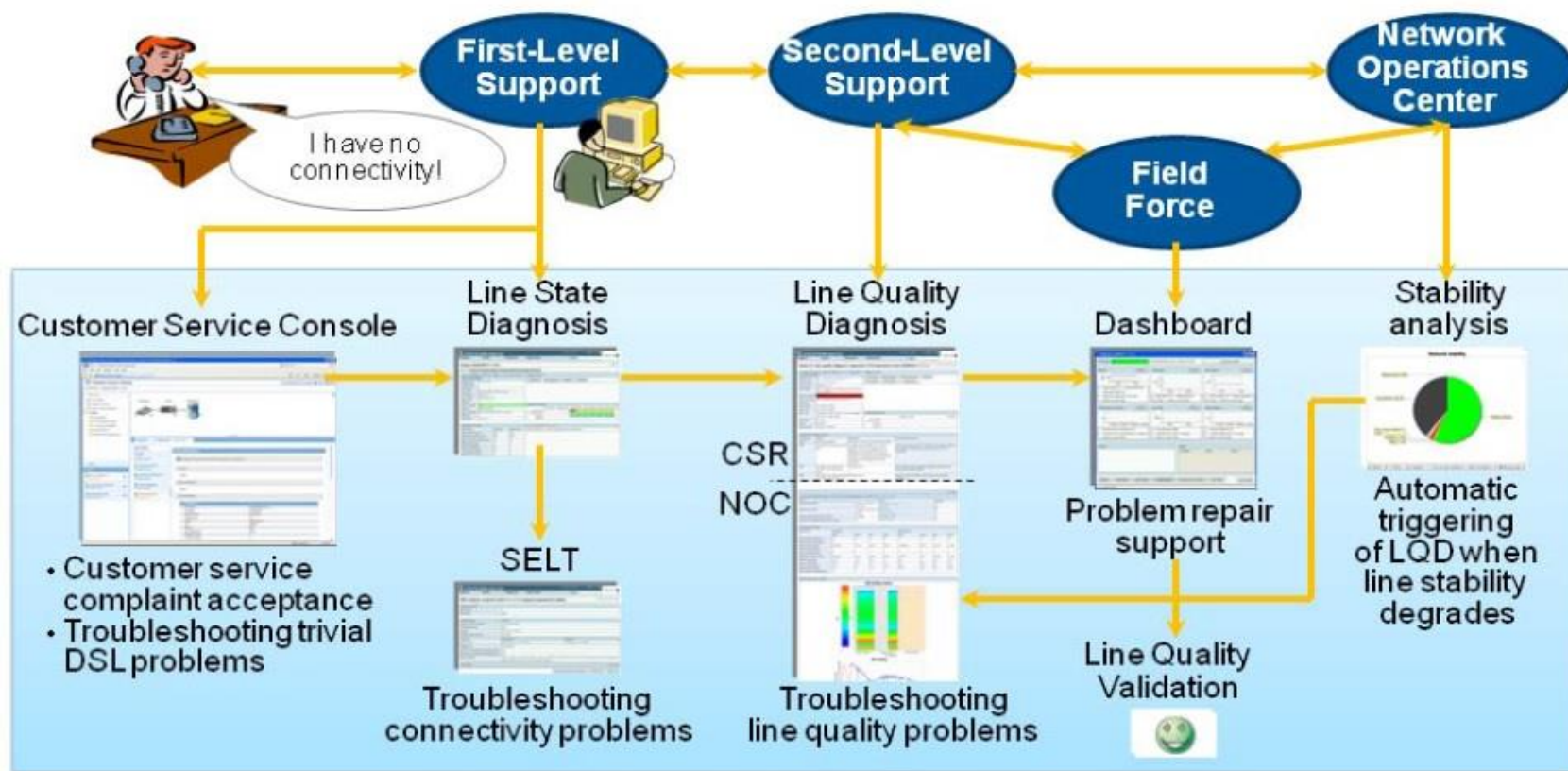
Upstream

Downstream

	Loop	Loop
Actual Rate [kb/s]	1021	6999
Attainable Rate [kb/s]	1093	17308
Loop Attenuation [dB]	9.7	15.1
Noise Margin [dB]	9.5	6.7
Actual PSD [dBm/Hz]	-38.0	-44.5
Output Power [dBm]	12.3	18.6

- Prikupljeni dnevni podaci prolaze kroz određeni algoritam i dobijeni rezultati su input za različite senzore koji detektuju probleme.
- U desnoj polovini prozora znakom uzvika obeležen je dan i vrsta smetnje za datu liniju u poslednjih deset dana.
- Accumulated-ispisuje datum uz smetnju koja je postojala za period pre poslednjih deset dana.
- Na dnu se vide parametri linije.

Jedan način primene NA u održavanju



Zaključak

- *Uz NA5530 ostvaruje se efikasniji nadzor, optimizacija i upravljanje DSL linijama pristupne mreže*
- *Uključivanje NA5530 u procese u okviru definisane arhitekture Telekoma Srbija omogućiće unapređenje CRM aplikacija i bolje korisničko iskustvo*
- *Potreban je dalji rad na implementaciji NA5530 kako bi se efikasno iskoristile sve njegove funkcionalnosti*

Hvala na pažnji!